SERVICE MANUAL

Chairman 2k/2s

permobil

US

How to contact Permobil

Permobil Inc. USA
6961 Eastgate Blvd.
Lebanon, TN 37090
USA
Phone: 800-736-0925
Fax: 800-231-3256
Email: info@permobilusa.com

Head Office of the Permobil group
Permobil AB
Box 120, 861 23 Timrå, Sweden
Tel: +46 60 59 59 00. Fax: +46 60 57 52 50
E-mail: info@permobil.se

Produced and published by Permobil AB, Sweden
Edition no.7, 2006-01
Article no.: 201158-US-0

Contents

Introduction 5
Technical support 5
Spare parts 5
Warranties 5
Maintenance 5
Identification plates 6
Chassis 6
Pilot+ output stage 6
Control panel 6
Operating the seat elevator manually 7
Covers 8
Batteries 9
Drive wheels 10
Replacement and adjustment of shock absorbers 11
Wheel lock release cables 12
Magnetic wheel locks 13
Drive motors 16
Seat elevator 18
Seat elevator cables 20
Seat elevator motor 21
Seat elevator drive belt 22
Adjusting the belt tension 22
Control panel 23
Seat control panel 23
Pilot+ output stage 24
SLS drive stage 25
ESP Module 26
Circuit breaker and fuses 30
Circuit breaker 30
Charge fuse 31
Fuse for seat/lights 31
Distribution chart 32
Troubleshooting 34

Introduction

The Service Manual is intended for technical personnel who maintain and repair electric wheelchairs. It is important that anyone who performs maintenance and repairs described in this manual reads and understands the content of this manual so that the work is performed professionally. Always state the chassis number when contacting Permobil to ensure that the correct information is provided.

Technical Support

In the event of technical problems, you should contact your dealer, or Permobil Inc. USA at 800-736-0925.

Spare parts

Spare parts must be ordered through your dealer.

Warranties

Contact your dealer or Permobil Inc. USA for information about the warranties for this chair.

Maintenance

See the information in the Owner's Manual.

Identification plates

Chassis

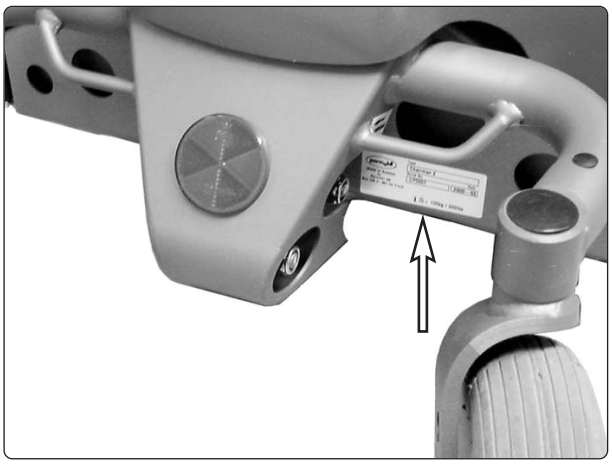


Fig. 1. Chassis Serial Number

Pilot+ power module (Controller)

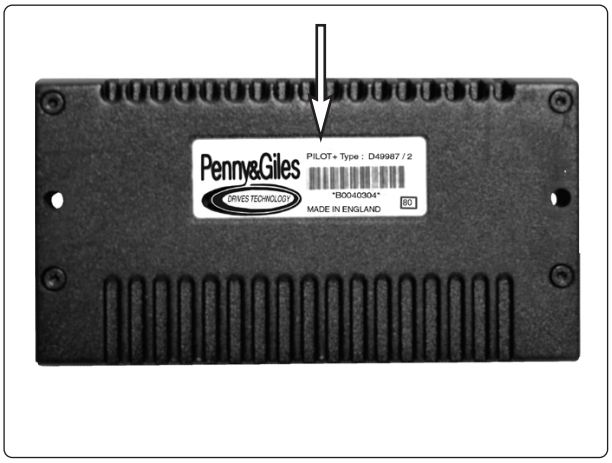


Fig. 2. Pilot+ Controller

Joystick

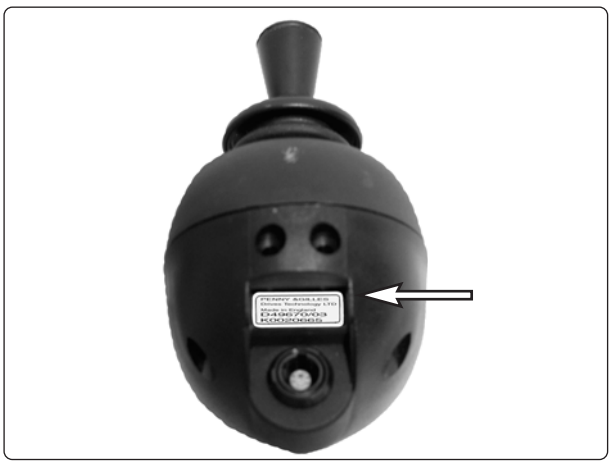


Fig. 3. Joystick/Control Panel

Operating the seat elevator manually

WARNING !

Warning! *Using a drilling machine during the manual operation of the seat lift is not allowed. There is a risk of material damage.*

Electric seat elevator

If the seat elevator will not move normally because the battery is flat or the adjusting mechanism is broken.

1. Remove the cushion and plastic plug from the seat.
2. Raise/lower the seat using the seat elevator crank supplied, see fig. 4.

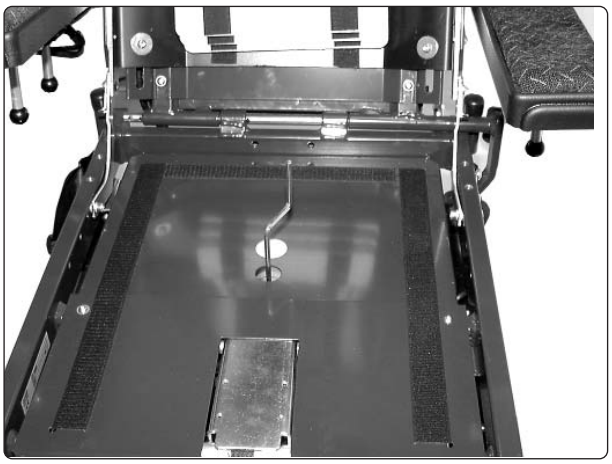


Fig. 4. Use the seat elevator crank to raise the seat.

Fixed seat post

1. Remove the cover and plastic plug from the seat.
2. Loosen the seat tube clamp screw (5:2).
3. Crank up the seat using the seat elevator crank supplied, see fig. 4.
4. Lower the seat and turn it so that the locating screw (5:1) seats in its groove.
5. Tighten the seat tube clamp screw. Torque: 11 ft.lb.

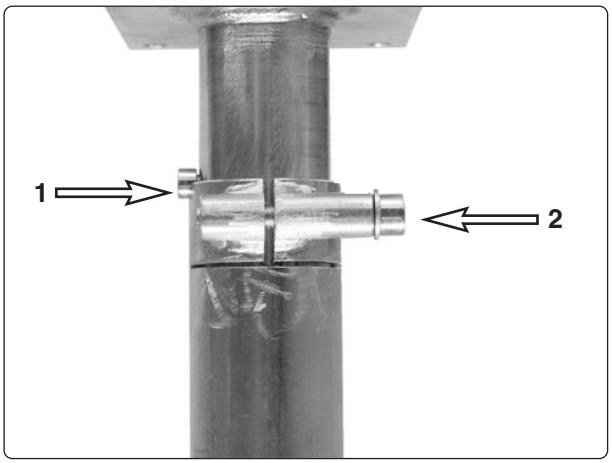


Fig. 5. Fixed seat post.

Covers

Detachment

1. Run the seat up to its uppermost position. See page 7 for instructions to manually raise the seat.
2. First remove the seat lift cover. It is mounted with four plastic plugs which can be flipped up using a screwdriver.

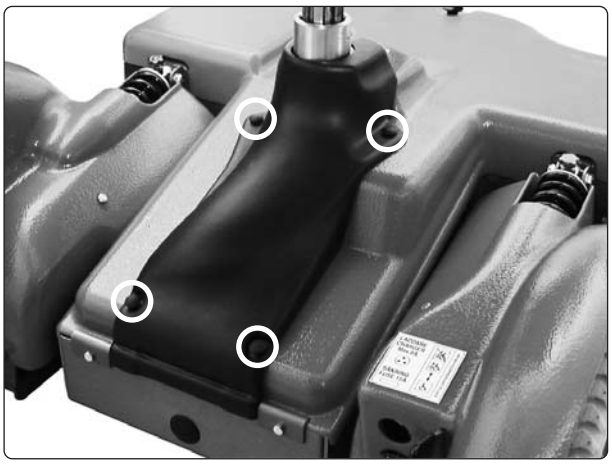


Fig. 6. The seat lift cover is mounted with four plastic plugs.

3. Unscrew the knob at the far back of the chassis cover, see fig. 7.
4. Push the cover back and lift it up at the same time.

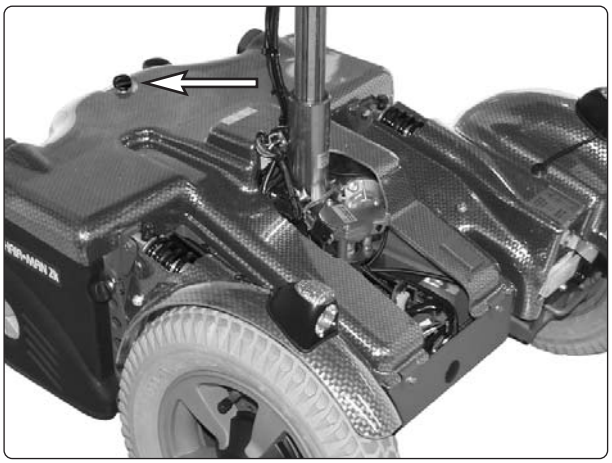


Fig. 7. The chassis cover is fastened with a knob.

5. Loosen the three screws that are holding the front fender on each side, see fig. 8.

NB! The front fender can be detached without dismounting the chassis covers.

Mounting

Mounting is performed in reverse order.

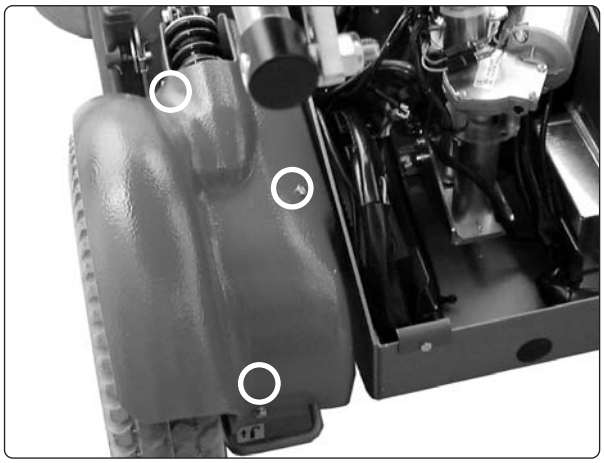


Fig. 8. The side cover is mounted with three screws.

Batteries

NB! Use protective goggles when working with batteries.

Removal

1. Place the wheelchair on a level surface.
2. Put the circuit breaker in the “OFF” position. It is accessible through a cut-out in the chassis cover, see fig. 9.
3. Lift the chassis cover up a little by loosening the knob holding the cover on, see fig. 9.

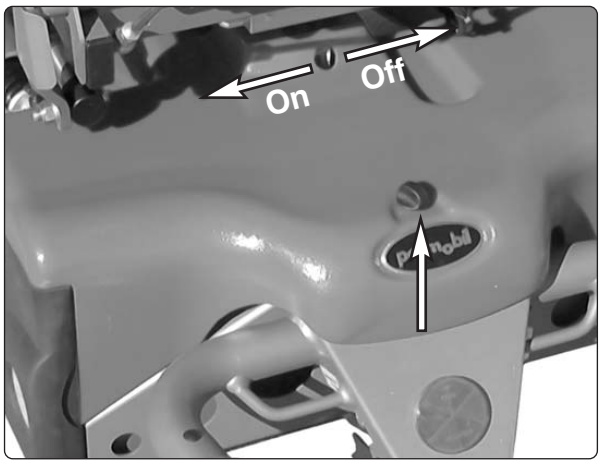


Fig.9. Circuit breaker 63A (On/Off) and the chassis cover knob.

4. Open the battery covers by loosening the knob and dropping the covers down, see fig. 10.

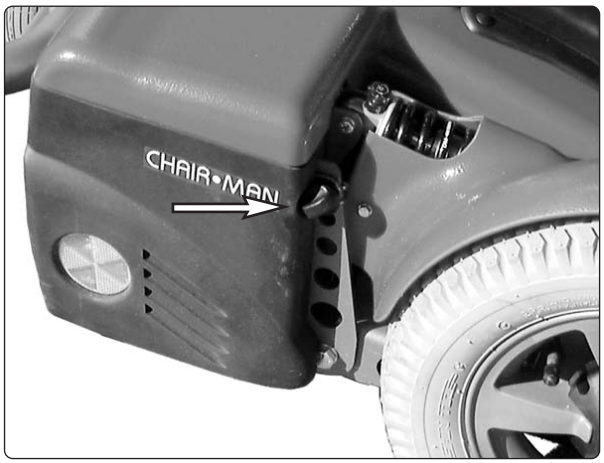


Fig.10. Battery cover knob.

5. Draw the respective batteries straight out using the battery strap, see fig. 11.
6. Loosen the battery connections. See the decal on the inner side of the battery covers.
7. Lift the batteries out.

Insertion

1. Lift two new batteries into place. Put the strap back around the new batteries in order to facilitate removal.
2. Connect the battery connections. See the decal on the inner side of the battery covers.
3. Push the batteries back into the chassis.
4. Close the battery covers and tighten the knob, see fig. 10.
5. Tighten the knob for the chassis cover, see fig. 9
6. Set the main fuse to the “ON” position. It is accessible through a cut-out in the chassis cover, see fig. 9.

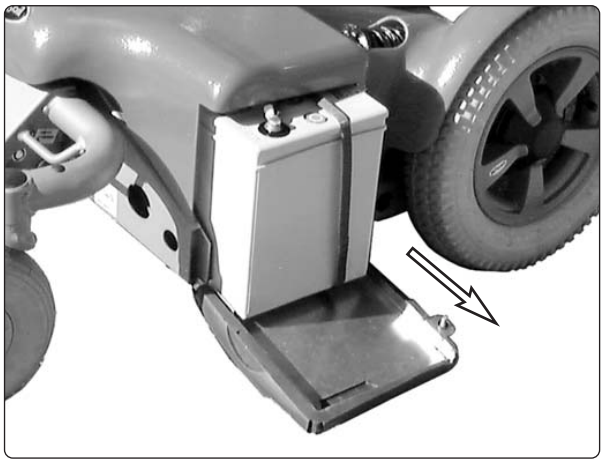


Fig. 11. Draw out the battery.

Drive wheels

Removal

1. Switch off the main switch.
2. Lift up the chair and support it on blocks, so that the wheels are off the ground.
3. Undo and remove the hubcap (6), bolt (3) and the three washers (1 and 2), see fig. 13.
4. Pull the wheel off the shaft. Use puller 304103-99-0 if the wheel is tight, see fig. 12.

Fig. 12. Puller 304103-99-0.

Fitting

1. Check the axle and rim for any damage. If necessary, you should clean these parts of dirt and rust. If any parts are damaged, they should be replaced.
2. Check that the key fits solidly in the keyway of the axle. If necessary, install the new key (4 or 5) and check for fit.
3. Lubricate the shaft with a thin layer of copper paste (Würth 0893800x, Art. no.: 1820540).

WARNING !

Warning! *Do not use any type of lubrication in the threaded hole in the axle or on the bolt. If necessary, you should clean these parts.*

4. Fit the wheel onto the axle. The use of hand force only is preferred, but, if need be, carefully use a rubber mallet, whose head diameter is no less than 1.5 inches (38 mm), to ensure that the rim is fully seated upon the motor.

NB! Hitting too hard with a rubber mallet could cause damage to the gear.

5. Mount the three washers (1) and (2) onto the bolt (3) and secure the wheel. **Use a torque wrench to tighten the bolt to 24 ft-lbs (33Nm).** Install the hub cap (6). See Fig. 13.

NB! The washer (1) should be placed with the most flat side inwards.

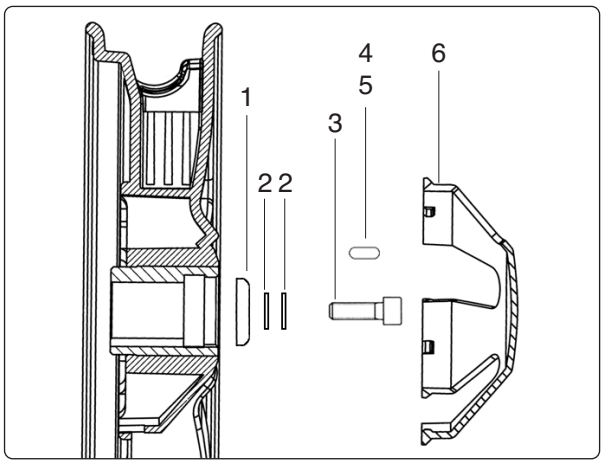
NB! The bolt must be used once only. Removed bolt is not allowed to be refitted.

WARNING !

Warning! *Other types of bolts or washers are not to be used..*

WARNING !

Warning! *Do not use any other type of thread lock.*



1. Washer, 8 HB 305 Fe/Zn 5 C2 (TBRSB 8,4x26x5)
2. Shim washer DIN 988 8 A2 (DB 8x14x0.5 Rostfri)
3. Bolt, ISO 4762 M8x25 10.9 Fe/Zn 5 C2 / Locking coat DIN 267-28
4. Key DIN 6885A 6x6x16
5. Key DIN 6885A 6x6x22
6. Hubcap

Fig. 13. Wheel attachment.

Replacement and adjustment of shock absorbers

Removal

1. Run the seat up to its highest position. See page 7 for instructions to manually raise the seat.
2. Switch off the main power switch.
3. Detach the front fender on the side on which the shock absorber is to be replaced, see page 8.
4. Jack up the chair so that the wheel is free on the side concerned.
5. Unscrew and remove the screw on the shock absorber's upper fastener, see fig. 14:1.
6. Unscrew and remove the screw on the shock absorber's lower fastener, see fig. 14:2.

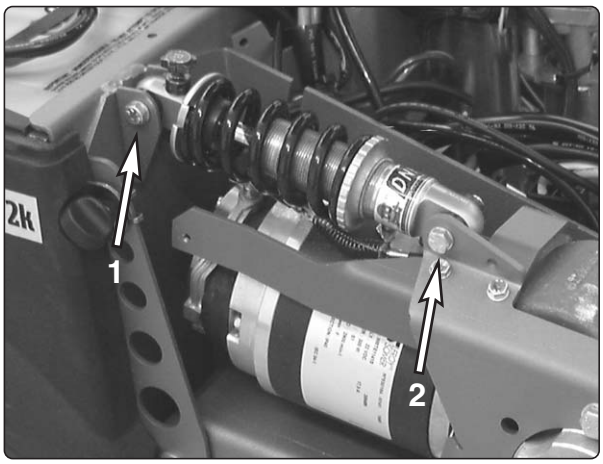


Fig. 14. The shock absorber is mounted with two screws.

Adjustment of the shock absorber

Before the new shock absorber is mounted, it must be adjusted to the proper value.

Return damping valve

To get standard setting, screw the return damping valve fully clockwise by hand. Then screw the valve fully counterclockwise, counting the ”clicks”. Then screw the valve halfway clockwise i.e. halve the number of ”clicks”.

Screw the valve clockwise (open the valve) for softer damping, or counterclockwise (close the valve) to have harder damping.

The spring force

The spring force can be set to suit different passenger weights using the adjustment nut. Increase the dimension for a harder suspension, decrease the dimension for a softer suspension.

NB! Make sure the stop spring is in the right position, see fig. 15.

Fitting

Mounting is performed in reverse order.

Passenger weights			Setting		
	-	110 lb.	0	-	3/32 inch
110	-	155 lb.	3/32	-	5/32 inch
155	-	200 lb.	5/32	-	1/4 inch
200	-	264 lb.	1/4	-	3/8 inch

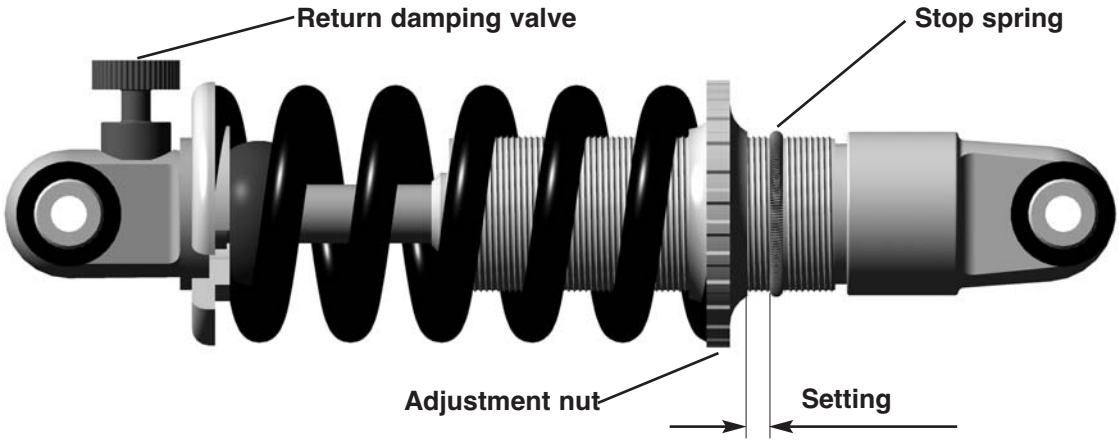


Fig. 15. The shock absorber is adjusted using the return damping valve and the adjustment nut.

Wheel lock release cable

Removal

1. Run the seat up to its highest position. See page 7 for instructions to manually raise the seat.
2. Remove the covers, see page 8.
3. Remove the wheel lock release cover, see fig. 16-17.
4. Loosen the locking nut(18:2).
5. Screw the adjustment screw in(18:1) completely.
6. Loosen the cable by the magnetic wheel lock by drawing the cable sleeve forwards and in front of the cable through the slot in the cable holder, unfasten the wheel lock release cable from the magnetic wheel lock.
7. Loosen the cable at the release lever.

Fitting

1. First mount the cable by the magnetic drum, and subsequently by the release lever.
2. Adjust the length of the cable sleeve using the adjusting screw(18:1), so that the wheel lock realease sensor(18:3) is activated immediately, before the cable pulls the release arm.
3. Check that the wheel cannot turn round before the wheel lock realease sensor(18:3) has been activated.
4. Check that the wheel can be turned when the wheel lock is disengaged by the release lever.
5. Tighten up the locking nut (18:2).
6. Remount the wheel lock release cover as well as other covers.

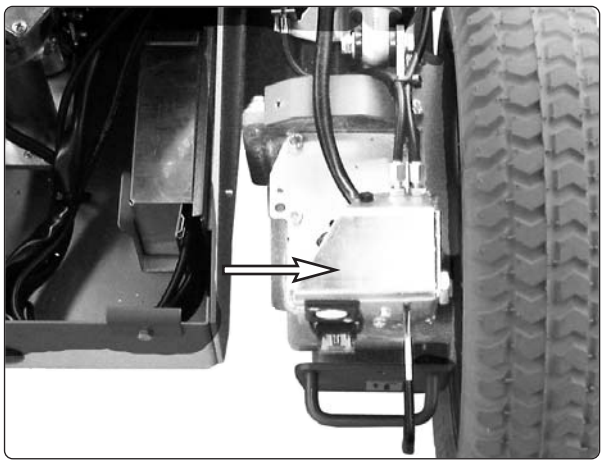


Fig. 16. Wheel lock release cover.

Fig. 17. Screws (qty. 2). wheel lock release cover.

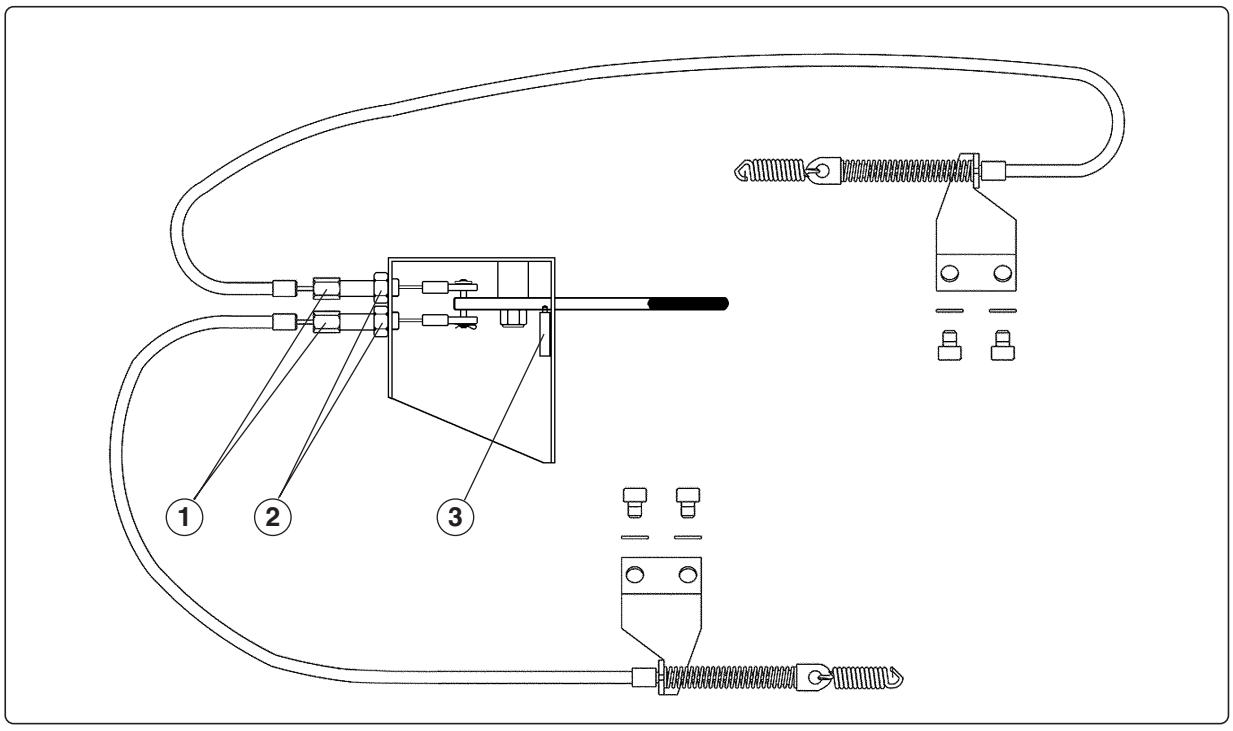


Fig. 18. Mechanism for wheel lock release.

Magnetic wheel lock

Removal

1. Run the seat up to its highest position. See page 7 for instructions to manually raise the seat.
2. Switch off the main power switch on the control panel.
3. Set the main fuse to the “OFF” position, see page 30, fig. 66.
4. Detach the covers, see page. 8.
5. Loosen the magnetic wheel lock's electrical connection, see fig. 19.

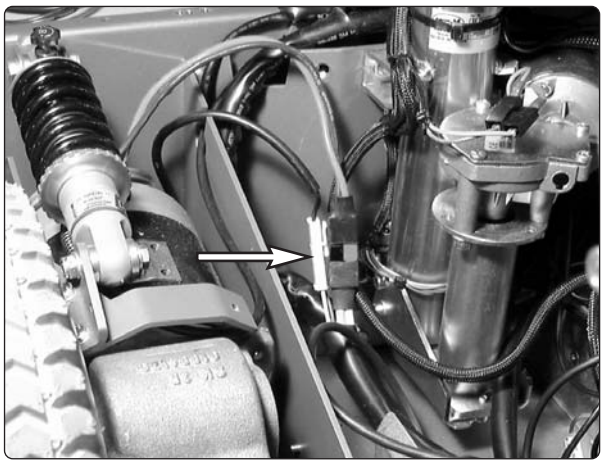


Fig. 19. The magnetic wheel lock's electrical connection.

6. Draw the cable casing forwards and in front of the cable through the slot in the cable holder, unfasten the wheel lock release cable from the magnetic wheel lock, see fig. 20.
7. Jack up the chair on the side concerned.
8. Loosen the shock absorber's upper fastener, follow the instructions for detaching shock absorbers through and including point 5, see page 11.
9. Bend the spring strut downwards in order to gain easier access to the magnetic wheel lock.

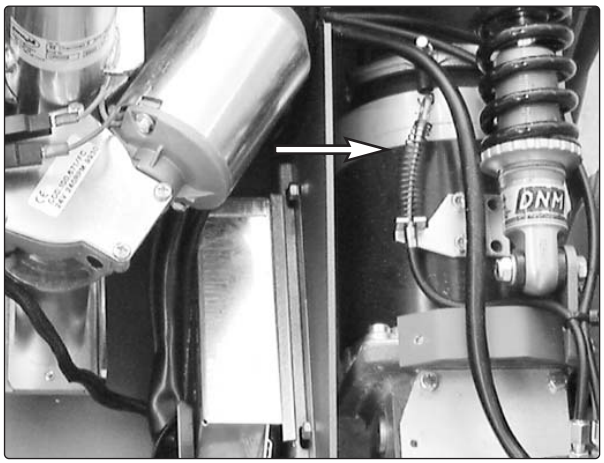


Fig. 20. Loosen the wheel lock release cable.

10. Unscrew the three screws holding the wheel lock, see fig. 21. Take note of the position of the wheel lock release arm as well as the position of the rubber seal for purposes of later remounting. Detach the wheel lock with the wheel lock disk and cover.

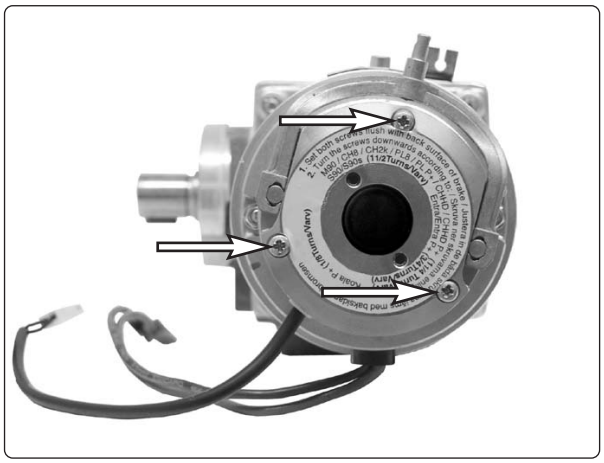


Fig. 21. Detach the magnetic wheel lock.

Fitting

1. Using the adjustment screws, adjust the setting of the magnetic wheel lock as per the instructions on the back side of the magnetic wheel lock, see fig. 22.

Fig. 22. The wheel lock setting is adjusted using the two adjustment screws.

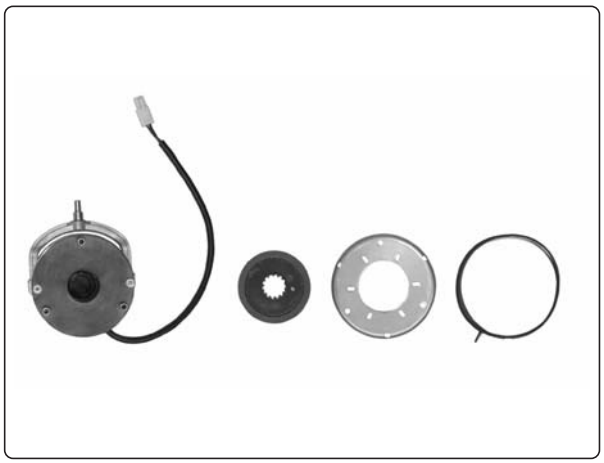


Fig. 23. Magnetic wheel lock, wheel lock disk, cover and rubber seal dismounted.

2. Place the wheel lock disc on the magnetic wheel lock.

3. Put the lock onto the motor.

Fig. 24. Magnetic wheel lock, wheel lock disk and cover mounted.

4. Thread a screw through in order to align the parts. Mount the rubber seal with the drainage hole downwards. Take note of the position of the wheel lock release arm, mount the wheel lock so that the wheel lock release arm is aligned with the motor's cable fastener. Then firmly screw in the magnetic wheel lock with the three screws.
5. Test to verify the wheel lock is adjusted: wheel should not turn easily when turned by hand. Release wheel lock by pushing the release arm toward the motor and turn wheel by hand. It should move easily.
6. Remount the shock absorber, see page 11.

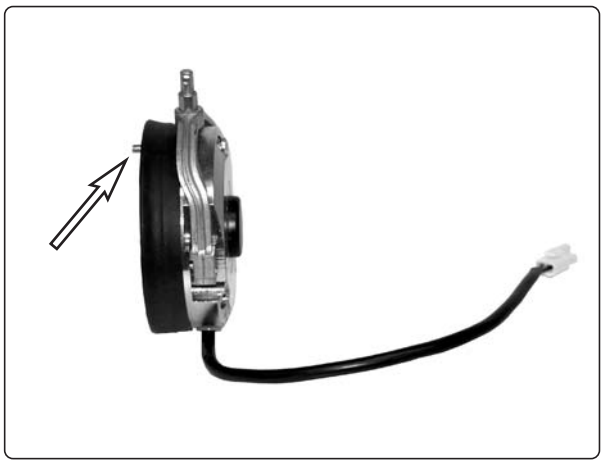


Fig. 25. Align the parts up against each other with one of the fastening screws. Mount the rubber seal

7. Put the electrical connections for the magnetic wheel lock back together, see fig. 26.

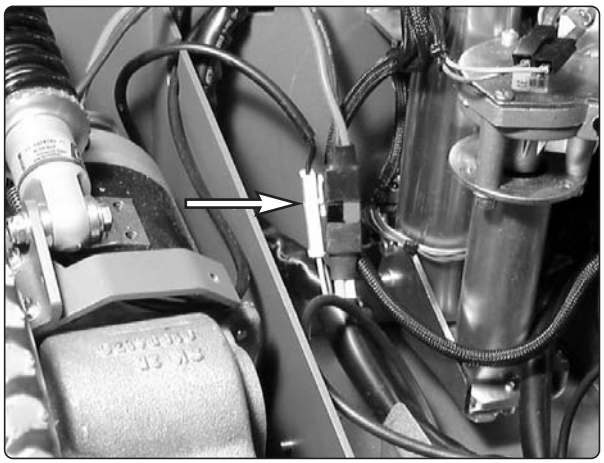


Fig. 26. The magnetic wheel lock's electrical connection.

8. Mount the wheel lock release cable, see fig. 27.
9. Mount the covers, see page 8.

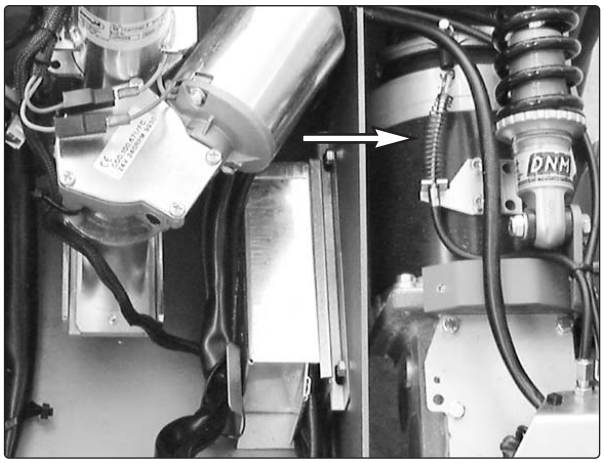


Fig. 27. Mount the wheel lock release cable.

Drive motor

Removal

1. Run the seat up to its highest position. See page 7 for instructions to raise seat manually.
2. Switch off the main power switch on the control panel.
3. Put the circuit breaker in the “OFF” position, see fig. 28.
4. Detach the seat lift and chassis covers as well as the front fender on the side where the drive motor will be replaced, see page 8.
5. Jack up the relevant side of the wheelchair.
6. Detach the drive wheel, see page 10.

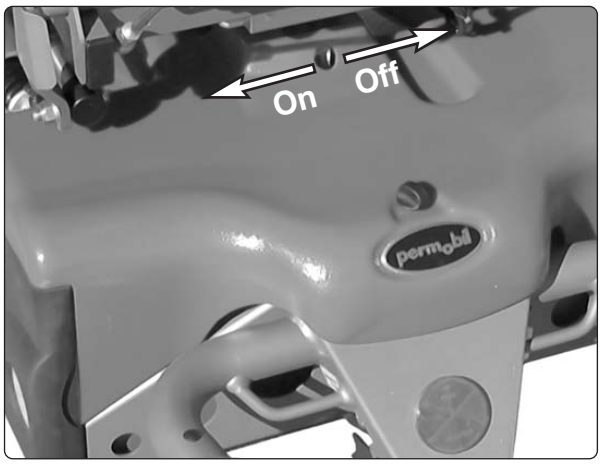


Fig. 28. Circuit breaker 63A (Off/On)

7. Loosen the electrical connections to the motor and the magnetic wheel lock, see fig. 29.

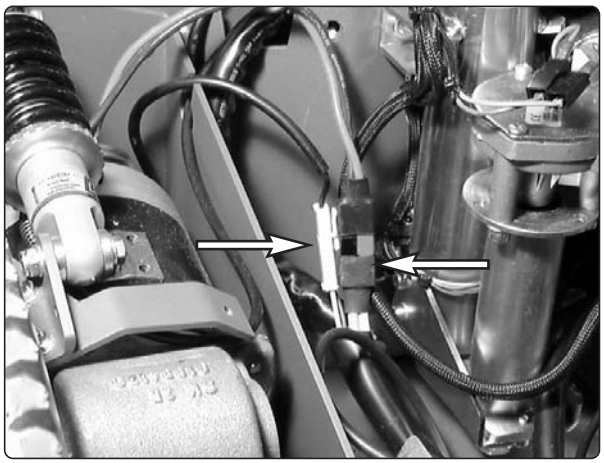


Fig. 29. Electrical connections for drive motor and magnetic wheel lock.

8. Draw the cable casing forwards and in front of the cable through the slot in the cable holder, unfasten the wheel lock release cable from the magnetic wheel lock, see fig. 30.

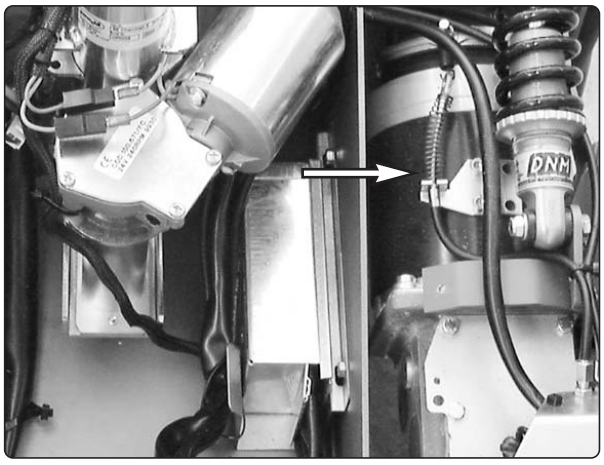


Fig. 30. Unfasten the wheel lock release cable.

9. Unscrew and remove the screw holding the lower shock absorber fastener (31:1) and bend the shock absorber upwards.

10. Loosen the three screws holding the motor approx. 1 revolution, see fig. 31:2.

11. Detach the spring strut by unscrewing and removing the screw on the back edge of the spring strut, see fig. 31:3.

12. Detach the drive motor by unscrewing and removing the three screws holding the motor, see fig. 31:2.

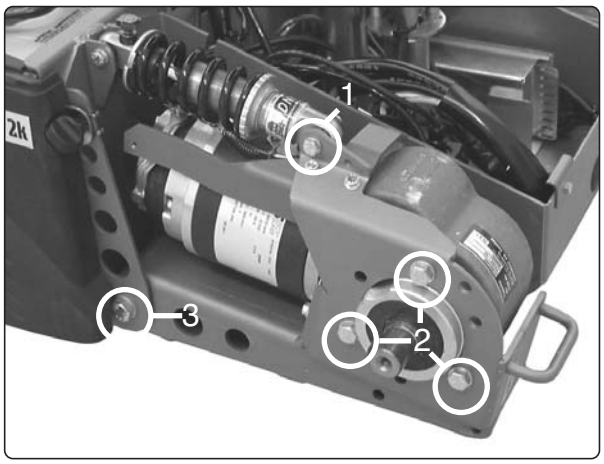


Fig. 31. Detachment of drive motor

Fitting

Fitting is performed in reverse order.

NB! Check that the drive motor: transition ratio is correct. The ratio is shown on the transmission identification decal, see fig. 32.

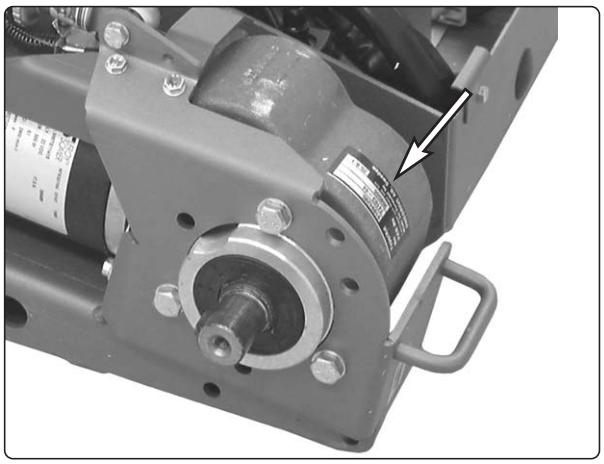


Fig. 32. Transmission identification decal.

Seat lift

Removal

1. Raise the seat using the accompanying seat lift crank, see page 7. Raise the seat until it will not go any higher while you crank, i.e. the seat lift is “not engaging”.
2. Switch off the main power switch on the control panel.
3. Set the circuit breaker to the “OFF” position, see page 30, fig. 66.
4. Detach the seat lift and chassis covers, see page 8.
5. Clip off the wiring bundle tie mounted on the cabling between the seat and the chassis.
6. Remove the seat lift motor's cable connection, pay attention to the placement of the cables for purposes of later remounting, see page 21.
7. Lift out the seat, place it on its side next to the chassis, see fig. 33.

NB! The seat is heavy, hence there should be two people to do this. Be careful with the cabling.

8. Unscrew and remove the two screws on the seat lift's upper fastener, see fig. 34.

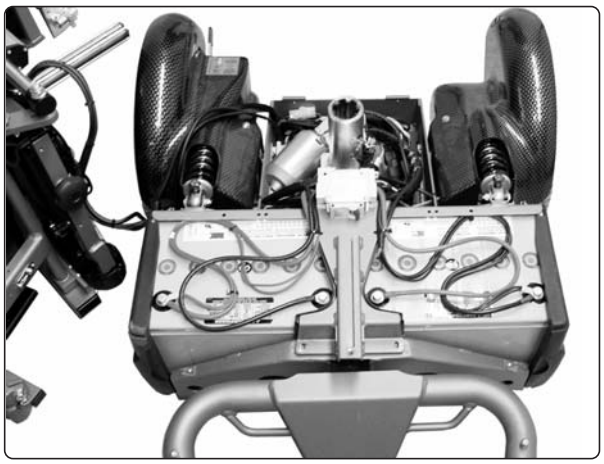


Fig. 33. Lift out the seat.

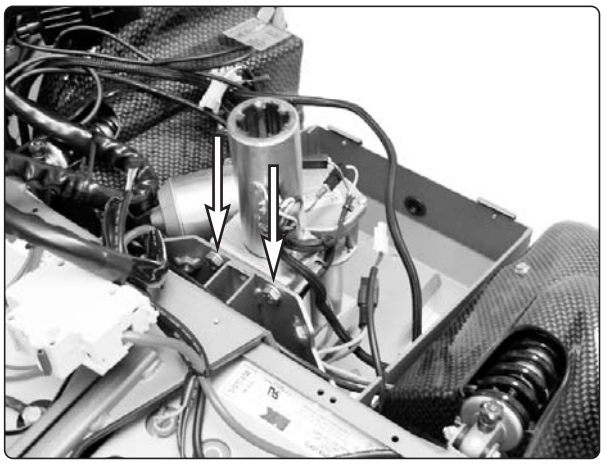


Fig. 34. Unscrew and remove the screws from the upper fastener.

9. Remove the two screws on the seat lift's lower fastener, see fig. 35.
10. Detach the seat lift by drawing it straight up.
11. Clip off the wiring bundle tie holding together the seat lift cabling, follow the cabling to its end, and loosen the contact at the SLS Drive, as well as the conductor joint located beside the SLS Drive.

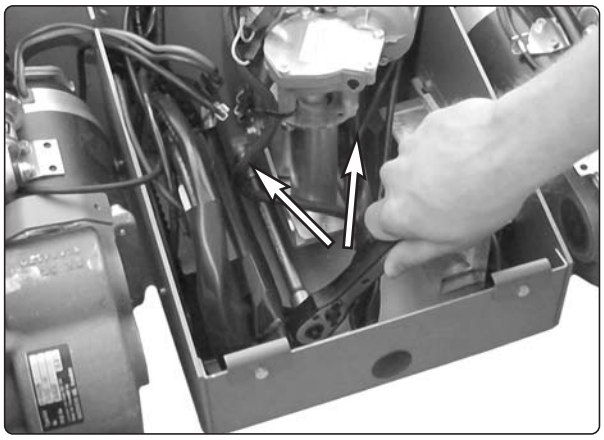


Fig. 35. Loosen the screws on the lower fastener.

The upper part of the seat lift is mounted on the seat and can be detached as described in the following.

12. Unscrew and remove the two screws holding the seat plate, see fig. 36.

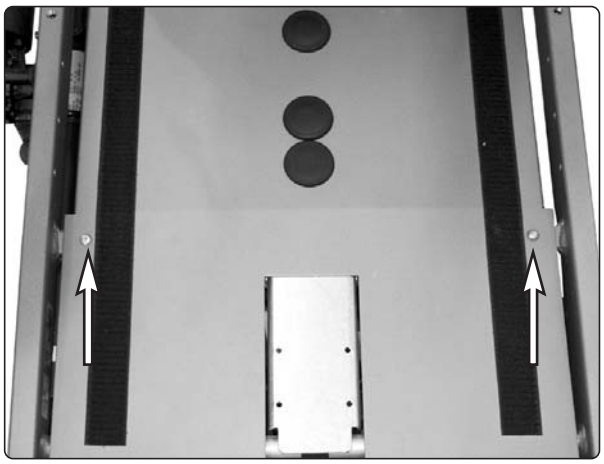


Fig. 36. The seat plate is mounted with two screws.

13. If the seat is equipped with seat tilt, unfasten the actuator's front bracket, see fig. 37. Draw the seat tilt mechanism apart, see fig. 38.

NB! Check which set of holes in which the seat frame is mounted to the seat lift platform, in order to replace it correctly later.

14. Unscrew and remove the four screws holding the seat lift, see fig. 38 and 39

Fig. 37. Unfasten the front bracket on the seat tilt actuator.

Fitting

Fitting is performed in reverse order.

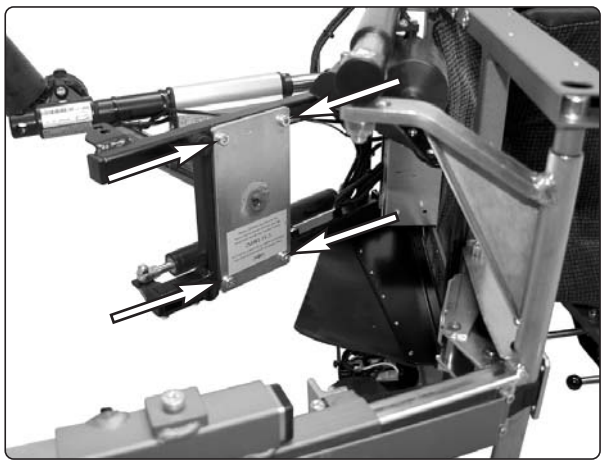


Fig. 38. Seat with seat tilt, the upper part of the seat lift is mounted with four screws.

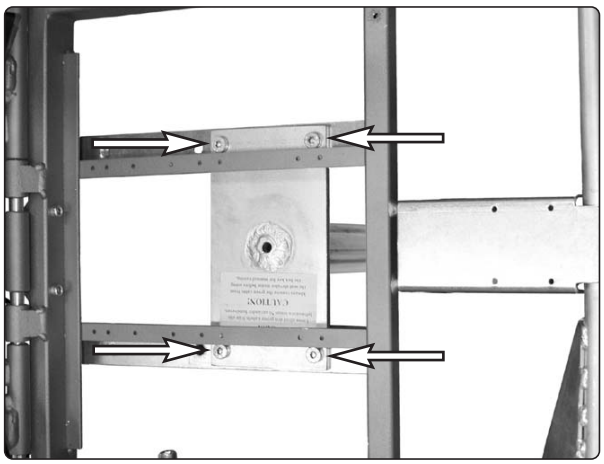


Fig. 39. Seat without seat tilt, the upper part of the seat lift is mounted with four screws.

Seat lift cable

Removing

1. Remove the seat lift; follow the instructions on page 18.
2. Remove the seat lift sensors. Note the position of the sensors for refitting, see fig. 40-41.

Fitting

Fitting is the reverse procedure.

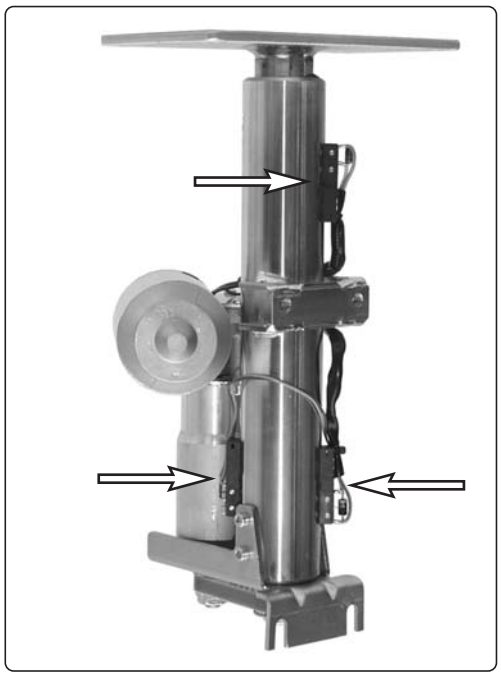


Fig. 40. Attachment of the sensors to the seat lift.

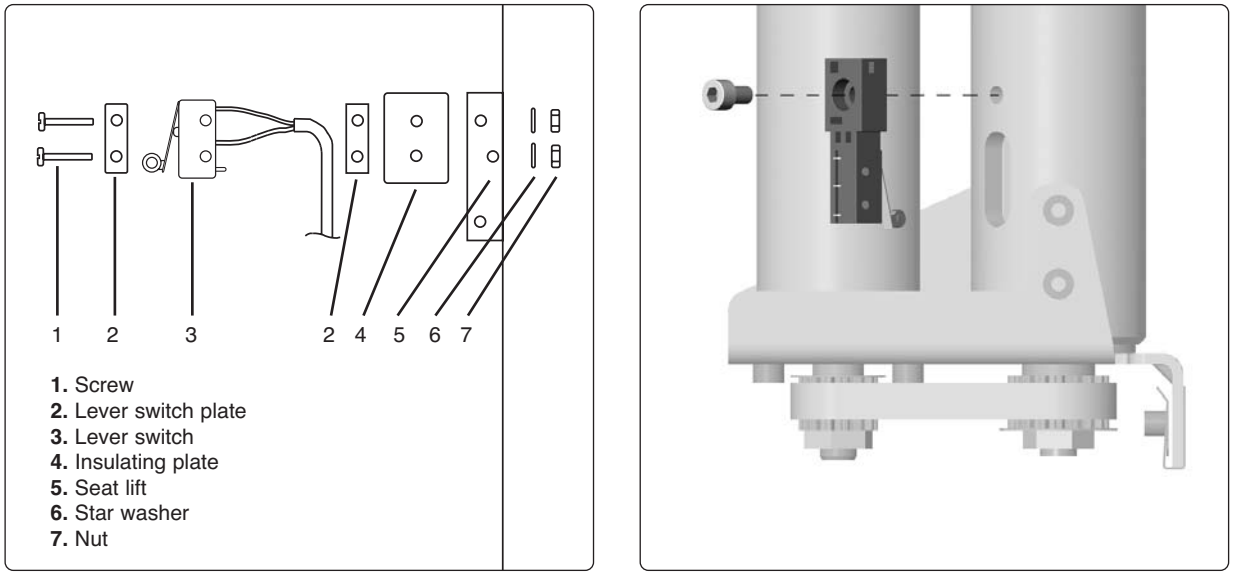


Fig. 41. Attachment of the sensors to the seat lift.

Seat lift motor

Removing

1. Remove the seat lift, see page 17.
2. Disconnect the seat lift cable at the motor, note the position of the connectors, see fig. 42.
3. Remove the seat lift motor by taking out the three bolts that hold it, see fig. 43.

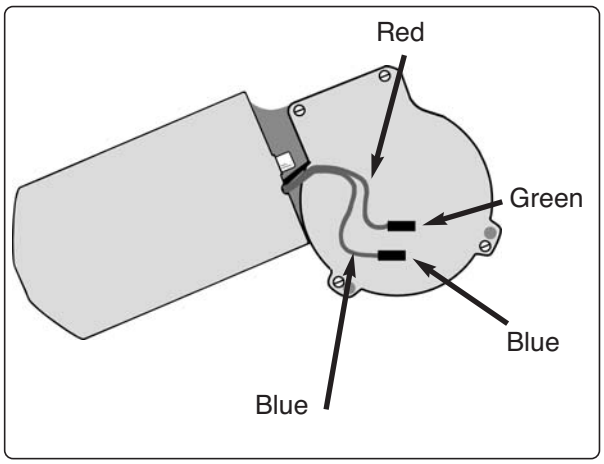


Fig. 42. Note the connector colors.

Fitting

Fitting is performed in reverse order.

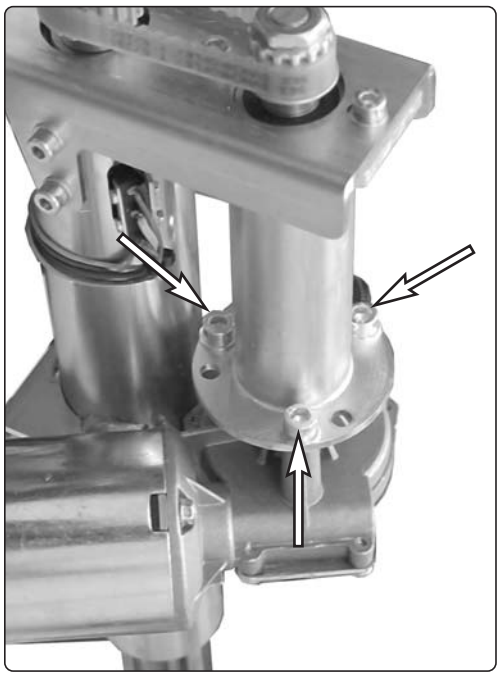


Fig. 43. The motor is attached by three bolts.

Seat lift drive belt

Removing

1. Remove the seat lift, see page 18.
2. Loosen the two bolts holding the shaft to the seat lift motor. Push the shaft sideways to slacken the drive belt.
3. Remove the belt from the motor shaft, then from the toothed wheel on the seat lift screw.
4. Fit the new belt using the reverse procedure.
5. Adjust the belt tension as described below.
6. Fit the seat lift, see page 18.

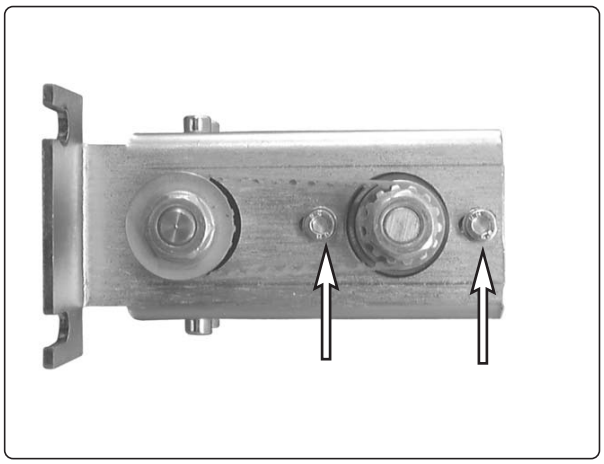


Fig. 44. The seat lift shaft is attached by two bolts.

Adjusting the belt tension

1. Loosen the two bolts near the belt, see fig. 44.
2. Adjust the belt tension by moving the motor shaft sideways.
3. Tighten the two screws.
4. Check the belt tension. The belt is correctly tensioned when it can be pressed in 4-5 mm, see fig. 45.

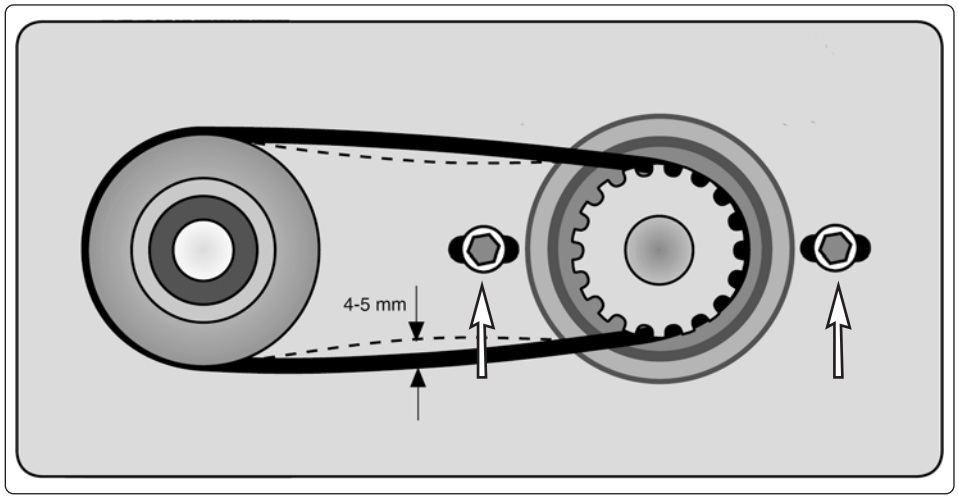


Fig. 45. The drive belt tension can be adjusted after the two bolts have been loosened.

Control panel

Removal

1. Switch off the main power switch on the control panel.
2. Put the circuit breaker in the “OFF” position, see page 30, fig. 66.
3. Disconnect the control panel cable by pulling the connector at the rear of the control panel straight backwards.
4. To remove the control panel, remove the screws holding the common bracket for the control panel and Seat control panel, see fig. 46. Remove the control panel bracket by removing the two screws on the rear of the control panel, see fig. 47.

Fitting

Fitting is the reverse procedure.

Fig. 46. The Control panel and Seat control panel bracket.

Seat control panel

Removal

1. Switch off the main power switch on the control panel.
2. Put the circuit breaker in the “OFF” position, see page 30, fig. 66.
3. Remove the cover of the Seat control panel by pulling it straight upwards. If the lid is stuck, you can carefully use a screwdriver to pry between the lid and the lower part of the end of the box, see fig. 48.
4. You can now lift the circuit board and cable out of the box.
5. Disconnect the cable from the circuit board by pulling the connector straight upwards, see fig. 49.
6. To remove the control panel, remove the screws holding the common bracket for the control panel and Seat control panel, see fig. 46. Remove the Seat control panel bracket by removing the two screws on the underside of the box, see fig. 47. Note the position of the bracket for refitting.

Fitting

Fitting is the reverse procedure.

Fig. 47. The Control panel and Seat control panel fixings.

Fig. 48. Removing the Seat control panel lid.

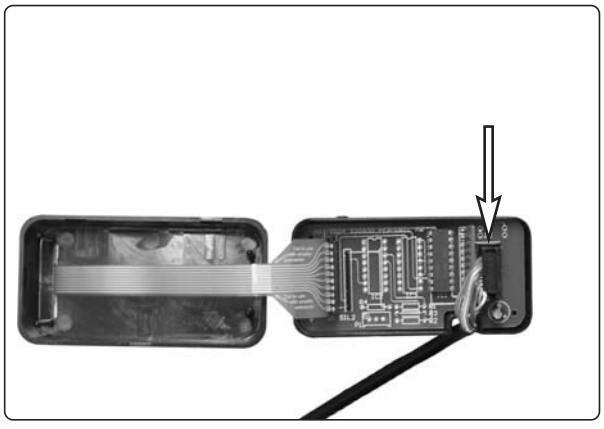


Fig. 49. The Seat control panel electrical connector.

Pilot+ controller

Removal

1. Run the seat up to its highest position. See page 7 for instructions to raise the seat manually.
2. Switch off the main power switch on the control panel.
3. Set the main fuse to the “OFF” position, page 30, fig. 66.
4. Detach the seat lift and chassis covers, see page 8.
5. Lift the Pilot+ controller out of its holder, see fig. 50.

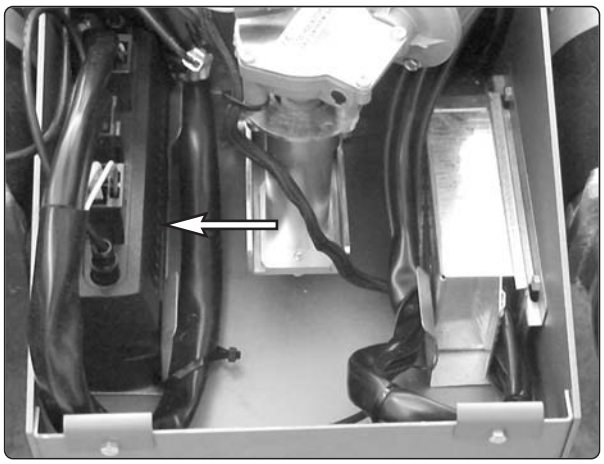


Fig. 50. Pilot+ controller in front compartment

6. Loosen the electrical connections to the Pilot+ controller, take note of their placement for purposes of later remounting, see fig. 51.

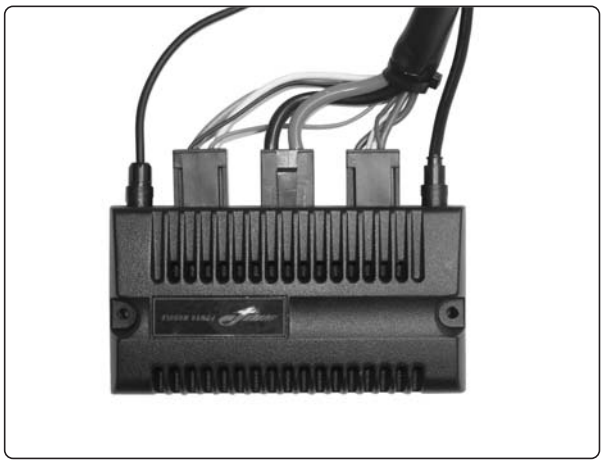


Fig. 51. Pilot+ Controller

Fitting

Fitting is performed in reverse order.

NB! Make sure that no cables are to be found in the area under the seat lift by the seat lift's drive belt, see fig. 52.

WARNING !

Warning! *The Pilot+ controller must be programmed before the wheelchair is taken into use. Otherwise the wheelchair may be very difficult to maneuver, with a high risk of accidents.*

WARNING !

Warning! *Test the way the wheelchair runs in a large open space. If the Pilot+ controller is incorrectly installed or incorrectly programmed, the chair may move rapidly in the wrong direction. Check carefully that it runs correctly in response to the controls.*

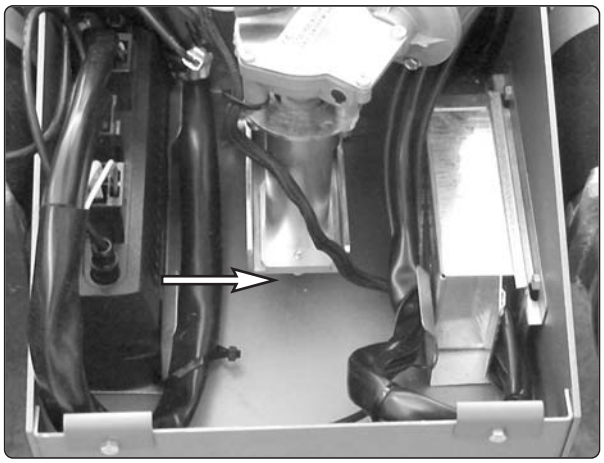


Fig. 52. Keep area beneath seat lift free of cabling.

SLS Drive stage

Removal

1. Run the seat up to its highest position. See page 7 for instructions to raise seat manually.
2. Switch off the main power switch on the control panel.
3. Put the circuit breaker in the “OFF” position, see page 30, fig.66.
4. Detach the seat lift and chassis covers, see page 8.
5. Lift the SLS Drive out of its holder, see fig. 53.
6. Draw the cover off of the SLS Drive.

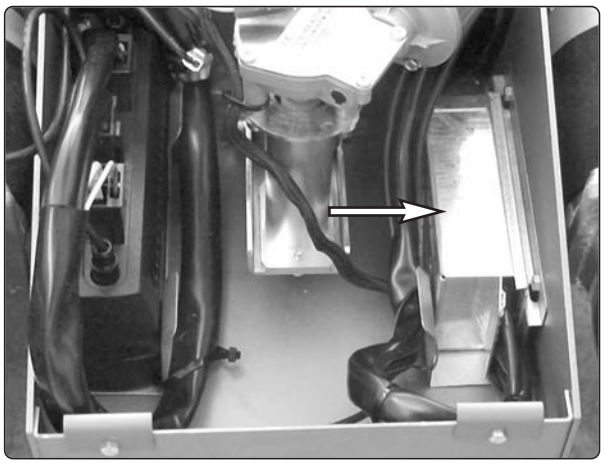


Fig. 53. The SLS Drive sits in its container without fastening screws.

7. Clip loose the wiring bundle tie holding the cables and loosen the electrical connections. Take note of their placement for purposes of later remounting.
8. Detach the card from the case by loosening the four plastic clips at the corners of the card. The fasteners can also take the form of two screws in the middle of the card.

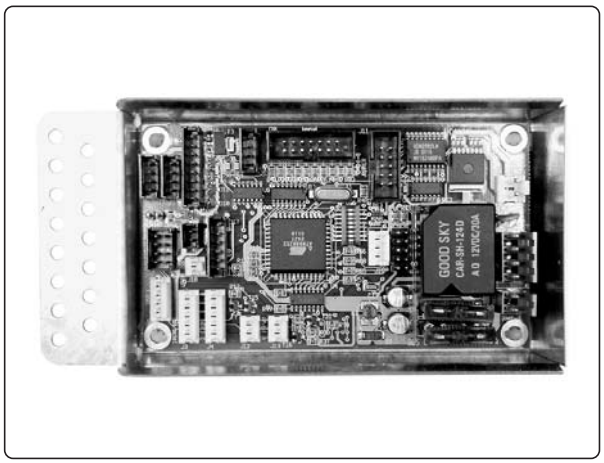


Fig. 54. SLS Drive.

Fitting

Fitting is performed in reverse order.

NOTE! Make sure that no cables are to be found in the area under the seat lift by the seat lift's drive belt, see fig. 55.

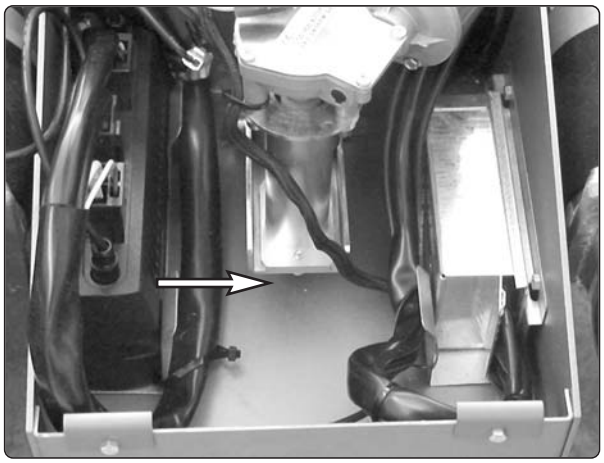


Fig. 55. Make sure that no cables are to be found in the area under the seat lift by the seat lift's drive belt.

ESP module (Applies to Chairman 2s)

Removal

1. Raise the seat to it highest position, or to raise it manually, see page 7.
2. Turn off the main power switch on the Control Panel.
3. Set the main fuse in the “OFF” position, see page 30.
4. Remove the housing from the seat lift and chassis, see page 8.
5. Unscrew and remove the two screws which hold the ESP module in position, see fig. 56.
6. Remove the ESP module connecting cable from the Pilot+ controller, drawing it straight out, see fig. 60:1.
7. Remove the control panel connection cable from the ESP module, drawing it straight out, see fig. 60:2.

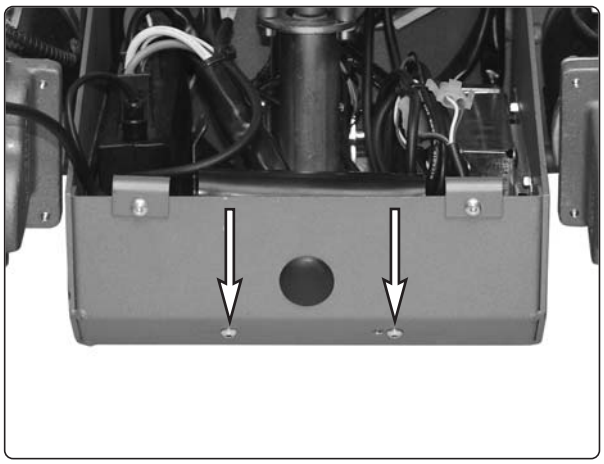


Fig. 56. The ESP module is mounted and attached with two screws to the front edge of the chassis.

Fitting

1. Fit the ESP module connecting cable to the output connection, see fig 60:1.
2. Fit the Control Panel connection cable to the ESP module, see fig. 60:2.
3. Attach the ESP module in the chassis using the two screws, see fig. 56.

NB! Check that the ESP module is firmly in position and that the screws are screwed in securely.

Fig. 57. ESP module.

4. Tip down the protective rubber sheet on the back of the ESP module, see fig. 58.

NB! Check that no cables cross the area under the seat lift, near the drive belt of the seat lift, see fig. 58.

Fig. 58. Keep area beneath seat lift free of cabling.

5. The ESP module is ready programmed from the factory. If the module is to be reprogrammed, see the technical manual of the ESP module for full details.

WARNING !

Warning! *The ESP module and the Pilot+ output connection must be correctly programmed when the wheelchair is in use. Otherwise the wheelchair may be very difficult to maneuver, with a high risk of accidents.*

WARNING !

Warning! *Test the way the wheelchair runs in a large open space. If the ESP module is incorrectly installed or incorrectly programmed, the chair may move rapidly in the wrong direction. Check carefully that it runs correctly in response to the controls.*

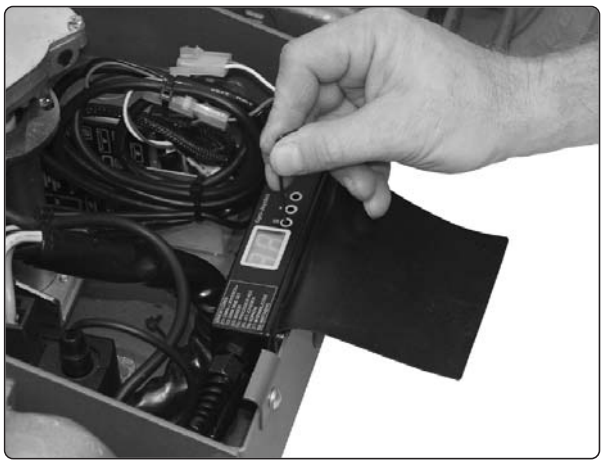


Fig. 59. Programming the ESP module.

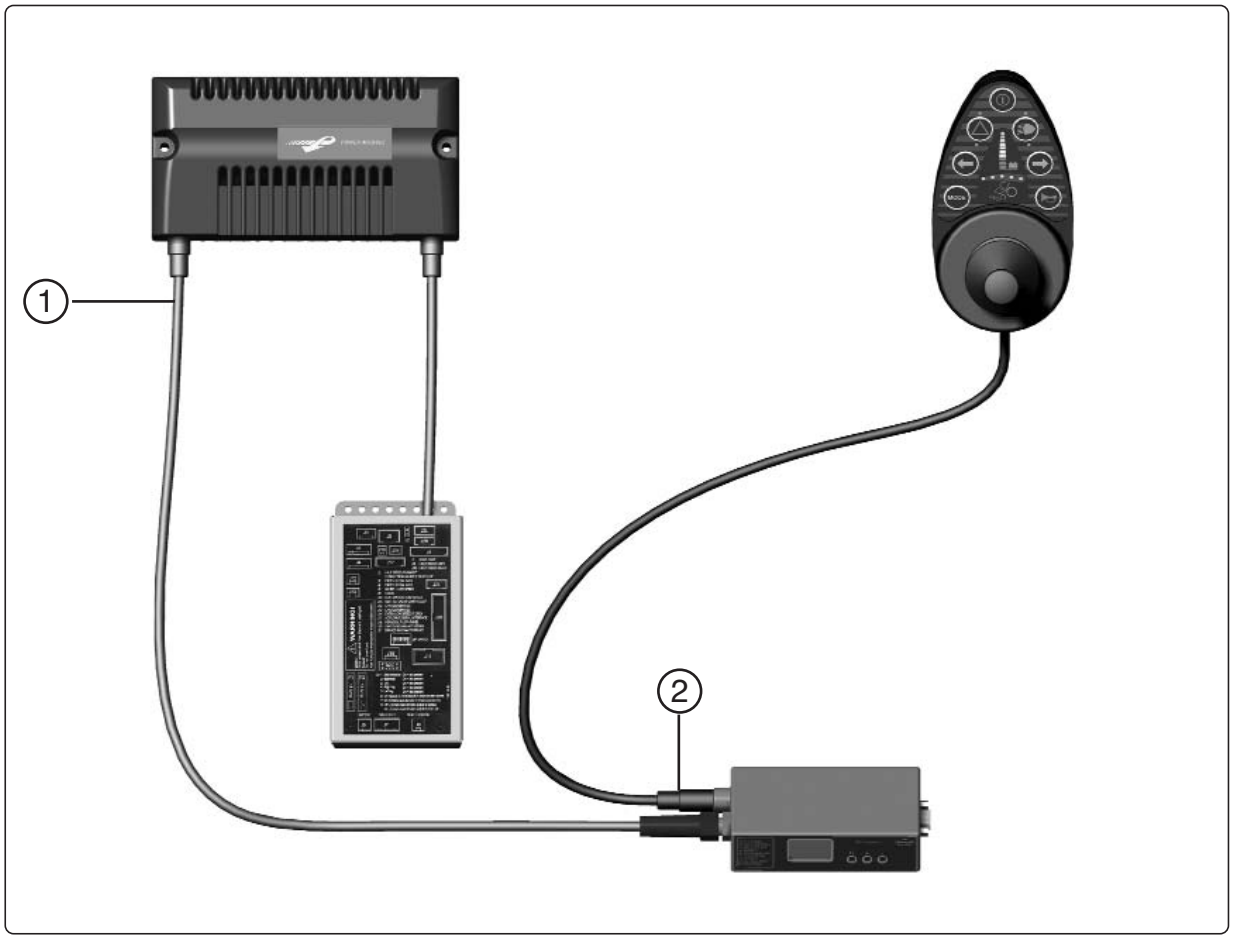


Fig. 60. The connections to the ESP module.

ESP module (Applies to Chairman 2s Lowrider)

Removal

1. Raise the seat to it highest position, or to raise it manually, see page 7.
2. Turn off the main power switch on the Control Panel.
3. Set the main fuse in the “OFF” position, see page 30.
4. Remove the housing from the seat lift and chassis, see page 8.
5. Lift the SLS Drive out of its holder, see page 25.
6. Carefully tilt the ESP-module, making the two bolt heads release from the guide holes in the SLS Drive holder. Lift the ESP-module straight upwards, see fig.61.
7. Remove the ESP module connecting cable from the Pilot+ controller, drawing it straight out, see fig. 65:1.
8. Remove the control panel connection cable from the ESP module, drawing it straight out, see fig. 65:2.

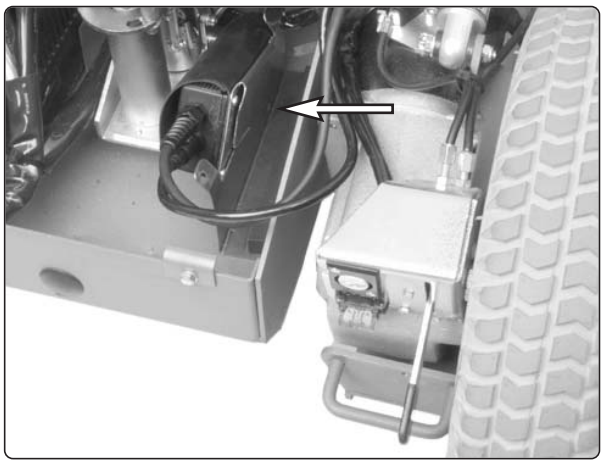


Fig. 61. The ESP-module is mounted on the SLS Drive holder.

Fitting

1. Fit the ESP module connecting cable to the output connection, see fig 65:1.
2. Fit the Control Panel connection cable to the ESP module, see fig. 65:2.
3. Mount the ESP-module with bracket on the SLS Drive holder, see fig. 61.

NB! Make sure the two bolt heads are fitted in the guide holes in the SLS Drive holder.

4. Remount the SLS Drive in its holder, see page. 25.

Fig. 62. ESP module.

5. Tip down the protective rubber sheet on the side of the ESP module, see fig. 63.

NB! Check that no cables cross the area under the seat lift, near the drive belt of the seat lift, see fig. 63.

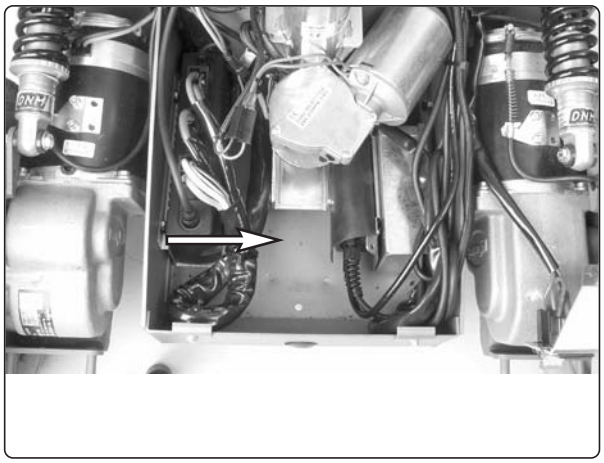


Fig. 63. Keep area beneath seat lift free of cabling.

5. The ESP module is ready programmed from the factory. If the module is to be reprogrammed, see the technical manual of the ESP module for full details.

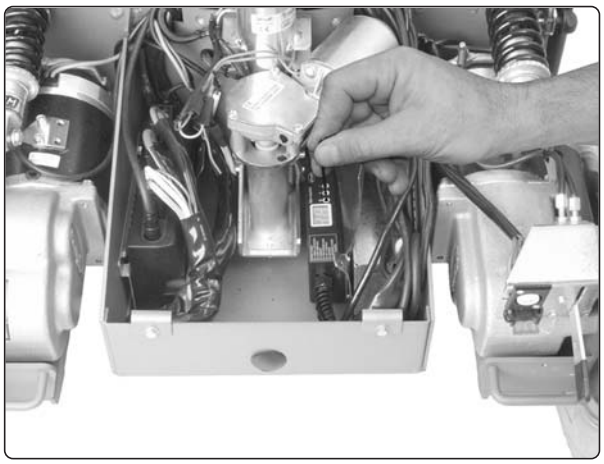


Fig. 64. Programming the ESP module.

WARNING !

Warning! *The ESP module and the Pilot+ output connection must be correctly programmed when the wheelchair is in use. Otherwise the wheelchair may be very difficult to maneuver, with a high risk of accidents.*

WARNING !

Warning! *Test the way the wheelchair runs in a large open space. If the ESP module is incorrectly installed or incorrectly programmed, the chair may move rapidly in the wrong direction. Check carefully that it runs correctly in response to the controls.*

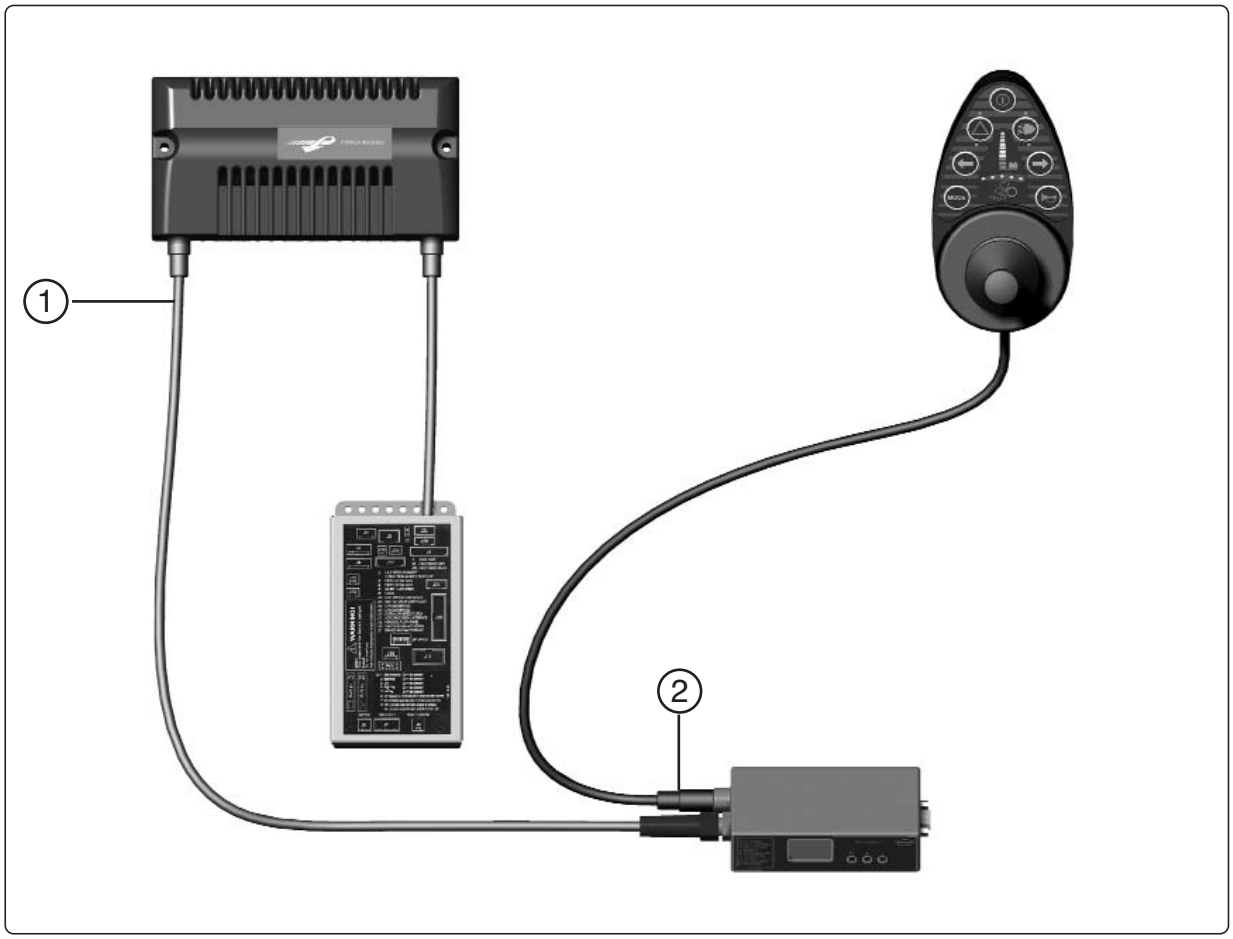


Fig. 65. The connections to the ESP module.

Circuit breaker and fuses

Resetting the circuit breaker

The circuit breaker also acts as a battery isolator, but is usually referred to as the circuit breaker.

You will not normally need to change the circuit breaker, as you can reset it when it has tripped. The main fuse can be accessed via a cut-out in the chassis cover behind the seat, see fig. 66.

NB! A tripped circuit breaker often means that there is a serious electrical fault. Check the cause thoroughly before you reset the circuit breaker.

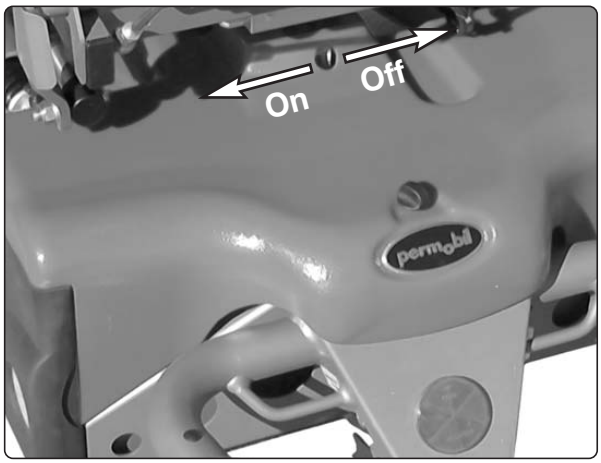


Fig. 66. Circuit breaker/Battery isolator.
Chairman 2k 63A
Chairman 2s 80A

Changing the circuit breaker

1. Switch off the main power switch on the control panel.
2. Put the circuit breaker in the “OFF” position, see fig. 66.
3. Remove the seat lift and chassis covers, see page 8.
4. Disconnect the battery positive lead.
5. Remove the circuit breaker by removing the two screws, see fig. 7.

NB! Note the orientation of the circuit breaker. The ON/OFF positions must agree with the label.

6. Set the new circuit breaker in the "Off" position.
7. Mount the cables on the new circuit breaker.

NB! Check that the cables are fully secure.

8. Mount the new circuit breaker with the two screws, see fig. 67.

NB! Check the orientation of the circuit breaker. The ON/OFF positions must agree with the label.

9. Screw the positive cable firmly onto the battery.
10. Mount the seat lift and chassis covers, see page 8.
11. Reset the main fuse to the ”ON” position, see fig. 66.

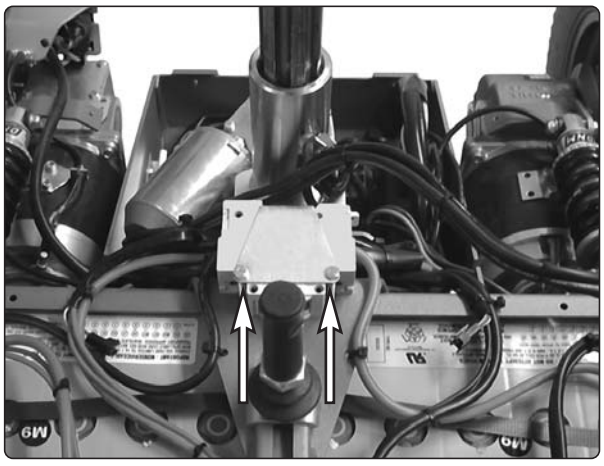


Fig. 67. Circuit breaker/Battery isolator.
Chairman 2k 63A
Chairman 2s 80A

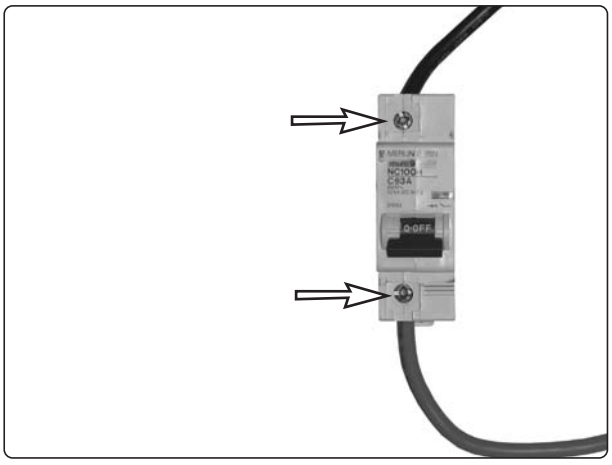


Fig. 68. Circuit breaker electrical connections.

Replacement of charging fuse

The charging fuse is located at the front edge of the left front fender, under the charging outlet, see fig. 69. Switch off the main power switch on the control panel and disconnect the charger before replacement of the charging fuse is performed.

NB! In order for the charging to function, the circuit breaker must also be set in the “ON” position.

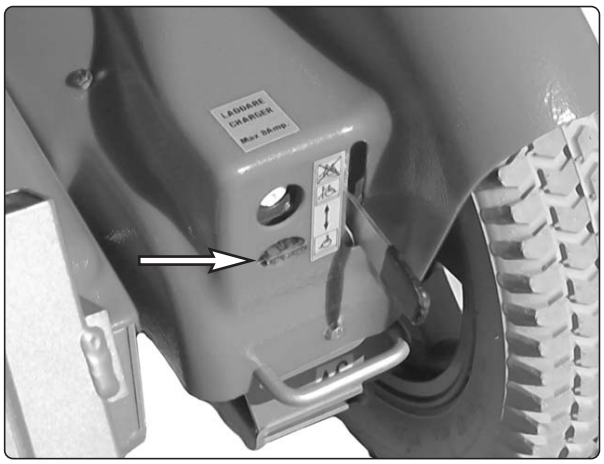


Fig. 69. Charging fuse 15A.

Fuse replacement for seat/lighting

On the SLS Drive, there are two fuses: F1 (24V unswitched) and F2 (24V switched). These provide fuse protection for two power outlets which are located to the left on the SLS Drive, beside the charging outlet. One of the outlets (24V unswitched) supplies power regardless of whether the chair is switched off or on. The other outlet (24V switched) supplies power only when the chair is switched on. The seat and lighting are normally connected to this outlet.

1. Switch off the main switch on the control panel.
2. Put the circuit breaker in the “OFF” position, see fig. 66.
3. Remove the seat lift and chassis covers, see page 8.
4. Lift the SLS Drive out of its holder, see fig. 70:1.
5. Pull the lid off the SLS drive stage.
6. Change the blown fuse.
7. Place the lid back onto the case.
8. Remount the SLS Drive into its holder.

NB! Make sure that no cables are to be found in the area under the seat lift by the seat lift's drive belt, see fig. 70:2.

9. Remount the covers, see page 8.

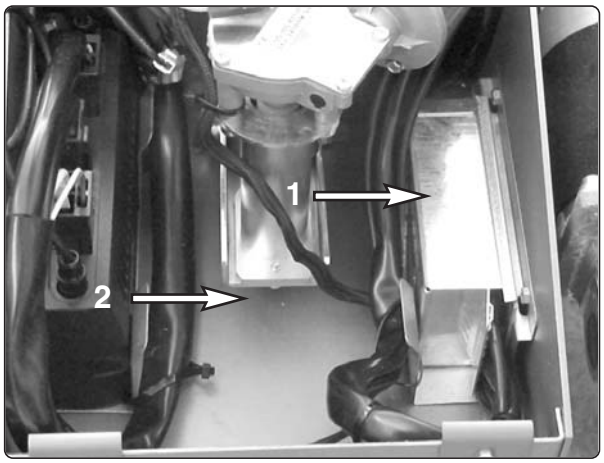


Fig. 70. The SLS Drive sits in its container without fastening screws.

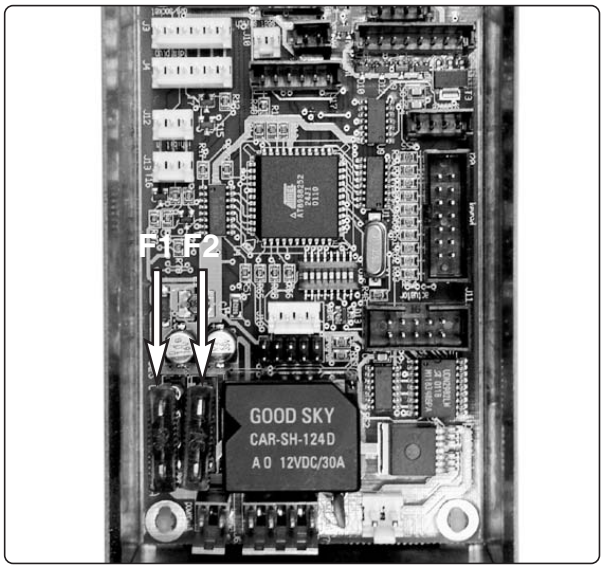
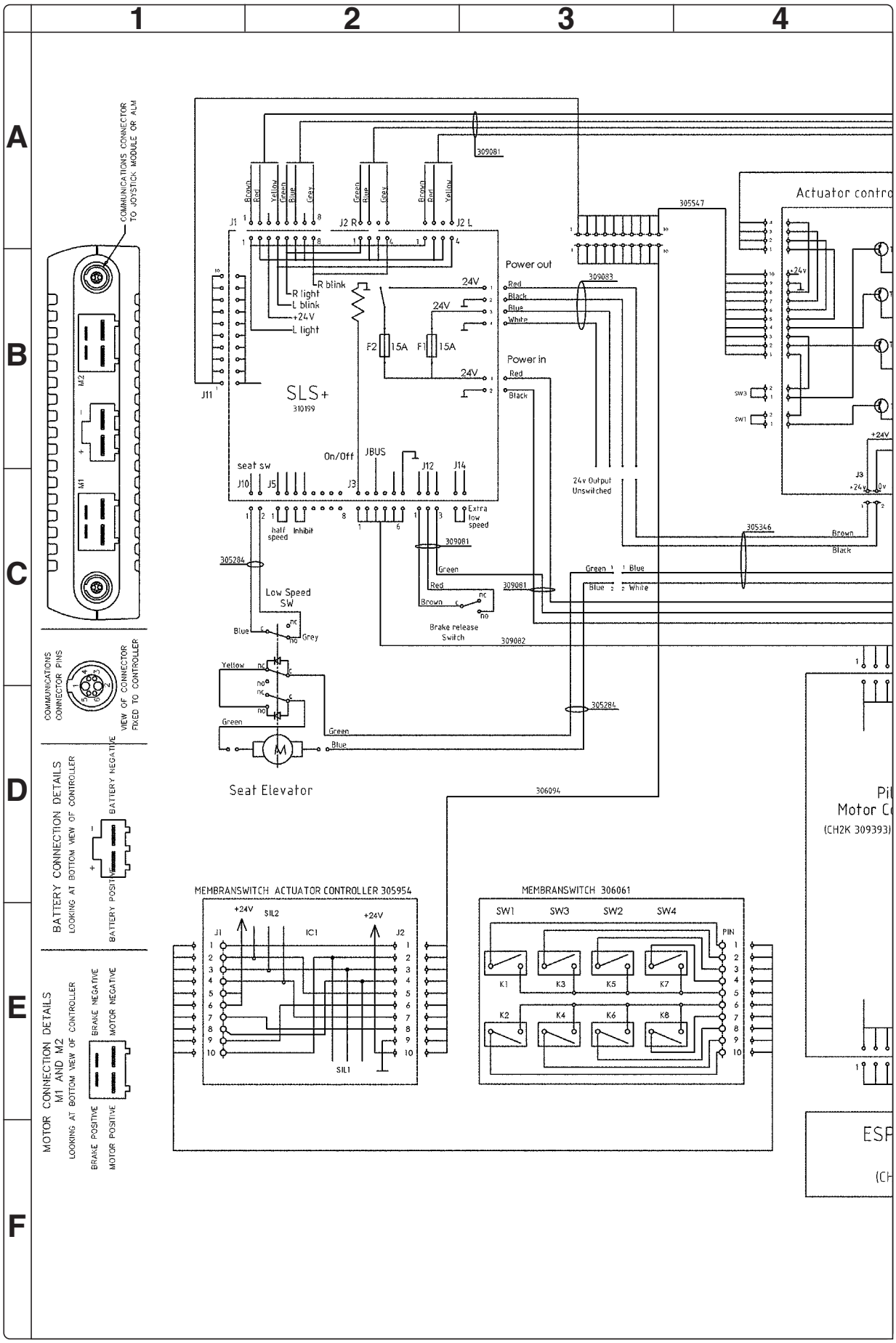
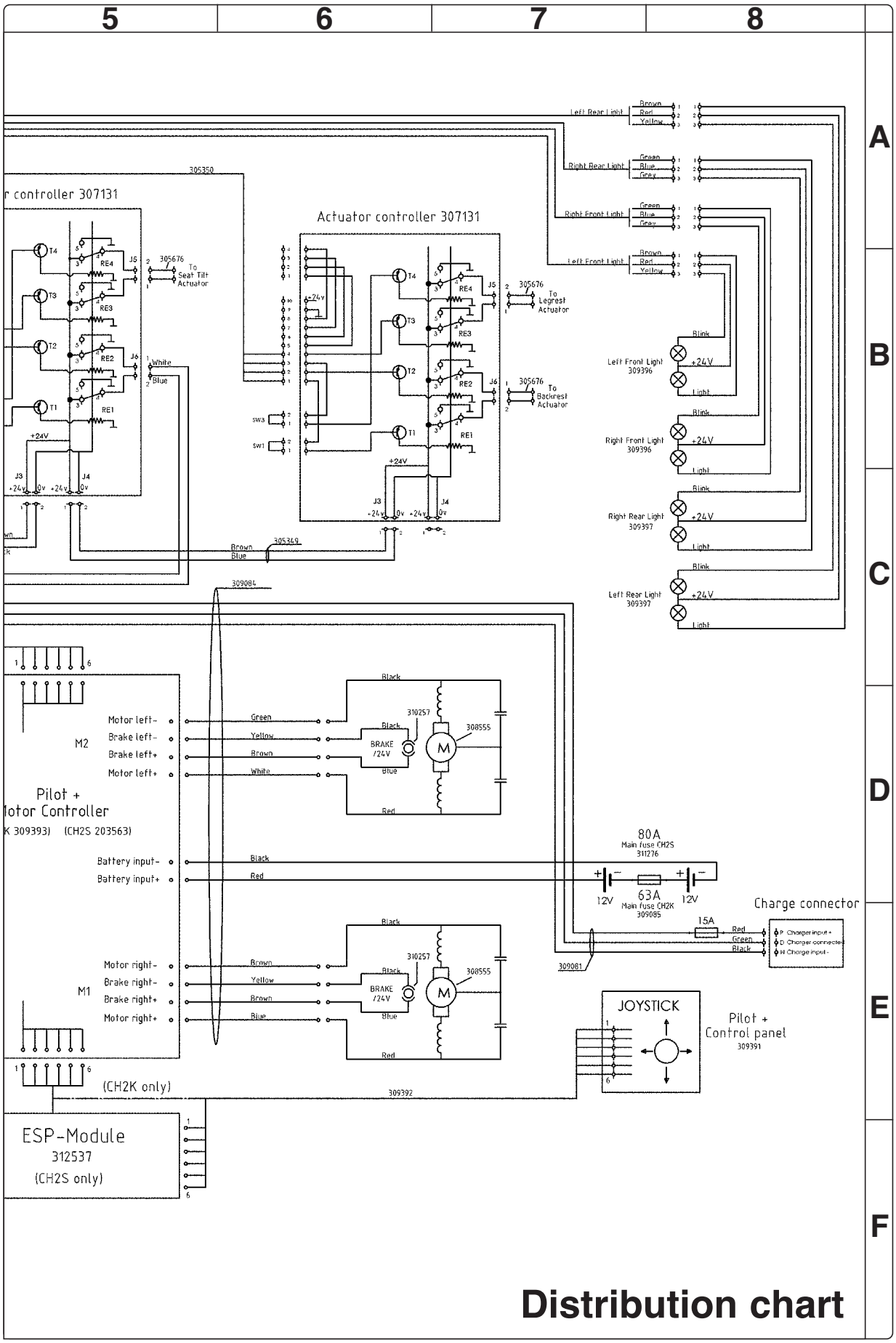


Fig. 71. F1 = 24V uninterrupted 15A.
F2 = 24V interrupted 15A Seat/Lighting.


1
2
3
4
A
B
C
D
E
F
COMMUNICATIONS CONNECTOR TO JOYSTICK MODULE OR ALM
M2
M1
COMMUNICATIONS CONNECTOR PINS
VIEW OF CONNECTOR FIXED TO CONTROLLER
BATTERY CONNECTION DETAILS
LOOKING AT BOTTOM VIEW OF CONTROLLER
BATTERY NEGATIVE
BATTERY POSITIVE
MOTOR CONNECTION DETAILS
M1 AND M2
LOOKING AT BOTTOM VIEW OF CONTROLLER
BRAKE NEGATIVE
MOTOR NEGATIVE
BRAKE POSITIVE
MOTOR POSITIVE
309081
Brown
Red
Yellow
Green
Blue
Grey
Green
Blue
Grey
Brown
Red
Yellow
J1
J2 R
J2 L
J11
R blink
R light
L blink
+24V
L light
24V
24V
24V
F2 15A
F1 15A
Power out
Red
Black
Blue
White
Power in
Red
Black
SLS+
310199
On/Off
JBUS
seat sw
J10
J5
J3
J12
J14
half speed
Inhibit
Extra low speed
305547
309083
24v Output Unswitched
Actuator contro
+24V
SW3
SW1
J3
+24v
0v
305346
Brown
Black
309081
305284
Low Speed SW
Green
Red
Brown
nc
no
Brake release Switch
309082
Blue
Grey
Yellow
Green
Blue
Seat Elevator
306094
Pi
Motor C
(CH2K 309393)
MEMBRANSWITCH ACTUATOR CONTROLLER 305954
+24V
SIL2
IC1
+24V
J1
J2
SIL1
MEMBRANSWITCH 306061
SW1
SW3
SW2
SW4
PIN
K1
K3
K5
K7
K2
K4
K6
K8
ESP
(CH



Distribution chart

Error signals - Battery voltage indicator

Every time the wheelchair is started up, a check is performed on parts of the wheelchair's electronics. If any faults have arisen in these parts, this is shown on the control panel's battery voltage indicator by one or more blinking lights.

Constant light

Everything is in order. How many lights are lit, depends upon how much voltage there is in the batteries. With fully charged batteries, all lights are lit.

Slowly blinking red lights

The batteries need to be charged immediately.

Rapidly blinking, 1 - 10 lights

Error signals, an error has arisen and the wheelchair can not be driven.

Error signals

The number of blinking lights indicate what the problem could be.

– Note the number of blinking lights.
– Turn off the wheelchair.
– Turn the wheelchair back on again.
– If the error persists, count the number of blinking lights, check possible causes and solutions in the table on the adjoining page.

NB! Possible error signals on the battery voltage indicator are not displayed while the wheelchair is being driven, they only first appear the next time the wheelchair is restarted.

⚠ **WARNING !**

Warning! *The remedying of errors that are indicated via the battery voltage indicator must be performed by a person with sufficient expertise to be able to perform such in a professional manner. Always contact an authorized serviceman when in doubt.*

CAUSE		SOLUTION
High battery voltage	10 Green	Check the battery and the connections between the battery and the control unit.
Failure in wheel lock circuit	9 Green	Check the connections to the magnetic wheel lock.
Fault in electronics	8 Green	Check the contacts to the output stage. If the fault persists, change the output stage.
Fault in the control panel	7 Orange	Make sure the joystick isn't actuated at switch-on, change the control panel.
Charger connected	6 Orange	Remove the charge plug from the charge socket in the wheelchair.
Short circuit right drive motor	5 Orange	Check the drive motor connections and cable.
Open circuit, right drive motor	4 Orange	Check the connection to the right drive motor.
Short circuit left drive motor	3 Red	Check the drive motor connections and cable.
Open circuit, left drive motor	2 Red	Check the connection to the right drive motor.
Low battery voltage	1 Red	Check the condition of the battery. Check the connection between the battery and the control unit.

Example:

Lights 1-6, 3 red and 3 orange, blinking rapidly upon start-up and the wheelchair can not be driven.

Cause:

The battery charger's charging contact is connected to the wheelchair's charging outlet.

Solution:

Finish/abort charging and remove the charging contact from the wheelchair's charging outlet.

Trouble Shooting Guide

The troubleshooting guide below describes a number of events that can arise when you use your wheelchair, as well as providing suggestions for solutions. Note that this guide does not describe all the possible events that can arise, and you should always get in touch with your service contact or Permobil when you are unsure

EVENT	POSSIBLE CAUSE	SOLUTION
The wheelchair does not start.	Batteries discharged.	Charge the batteries.
	The cable connection to the conttrol panel has become loose.	Atttach the cable to the control panel.
	Main fuse set in ”OFF” position after, for example, changing batteries.	Reset the main fuse. See page 30.
	Main fuse triggered.	**See page 30.**
The wheelchair can not be driven.	Battery charger connected.	Terminate the charging and remove the charging cable from the charging outlet.
	Wheel lock release activated.	Reset the wheel lock release.
	Wheelchair locked with the security key.	Unlock the wheelchair. See Owner´s manual.
Battery voltage indicator on the control panel rapidly blinking and the wheelchair can not be driven.	Fault indicated in the drive electronics.	See page 32-33.
The wheelchair stops while being driven.	The cable connection to the control panel has become loose.	Attach the cable to the control panel.
The wheelchair can only be driven with reduced speed. *Applies for electrical seat lift and seat tilt only.*	Seat tilt or seat lift raised to high, alt. backrest activated more than 15°.	Lower seat lift or seat tilt, alt. move the back rest forward. See Owner´s manual.
The wheelchair will not charge.	Main fuse set in ”OFF” position after, for example, changing batteries.	Reset the main fuse See page 30.
	Triggered charging fuse due to fault in, for example, batteries, charger, charging cables, charging outlet.	Carefully check possible causes before replacing. See page 29.

permobil

Article no.: 201158-US-0